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High Temperature Circuit Breaker

An ac circuit breaker satisfies the design and operating criteria requiring components suitable for reliable long-term service at 1000°F in the vacuum conditions of outer space. Construction materials were selected for their resistance to nuclear radiation and vacuum welding.

The circuit breaker was service tested to 1000°F in a vacuum of 10^{-6} torr for 2700 hours. Over 100 close/open cycles were initiated under a 600A, 60Hz load. Subsequently, 32 close/open cycles were initiated with the current increased to 2400A in 200A steps. Finally, 11 fault interruption tests were conducted in the range from 1800A (zero to peak) at 462V rms at interruption to 3750A at 960V, 950Hz.

For current only, the tests were run at approximately 50% above design rating; for power, a 40% over-capacity was achieved. This power interruption capability amounts to 2.5MW on a single-phase basis, or 7.5MW on a three-phase basis. Closing times were 25 milliseconds; opening times, 7 milliseconds ± 2 milliseconds. All charts of the closing and opening times were essentially identical, showing excellent repeatability.

Notes:

1. The following documentation is available from:
National Technical Information Service
Springfield, Virginia 22151
Single document price \$3.00
(or microfiche \$0.65)

Reference:

NASA-CR-1719, Design, Performance, and Evaluation of an AC Breaker for Space Power Nuclear Electric Systems

2. Technical questions may be directed to:
Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B70-10721

Patent status:

No patent action is contemplated by NASA.

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